

CLAIMS

What is claimed is:

1. A method of forming a fuel filler tube assembly comprising:
forming a funnel insert;
forming a funnel portion at a first end of a filler tube; and
joining the funnel insert and the funnel portion of the filler tube.
2. The method of Claim 1, further comprising configuring a transition portion of the funnel portion to induce a swirl to passing fuel for venting vapors from the gas tank during fuel filling.
3. The method of Claim 2, wherein said configuring includes:
forming an inlet at one end of the funnel portion, the inlet having a first axis; and
forming an outlet of an opposite end of the funnel portion, the outlet having a second axis offset from the first axis.
4. The method of Claim 1, further comprising forming a sealing surface about an inlet opening to the funnel insert.
5. The method of Claim 4, wherein said forming includes rolling over an edge defining the inlet opening.

6. The method of Claim 1, further comprising cutting a length of tube stock to form the filler tube.

7. The method of Claim 1, further comprising forming a nozzle receptor in the funnel insert.

8. The method of Claim 1, further comprising joining an end of the filler tube opposite the funnel insert to a fuel tank.

9. The method of Claim 8, further comprising joining opposite ends of a vent tube to the funnel portion and the fuel tank, respectively.

10. The method of Claim 1, further comprising joining a vent tube to the funnel portion of the filler tube.

11. The method of Claim 1, further comprising forming threads in the funnel insert.

12. A fuel filler tube assembly comprising:

a funnel portion of a filler tube includes a tubular body defining a larger inlet and a smaller outlet, the position of the inlet relative the outlet and an internal configuration of the tubular body between the inlet and outlet inducing a swirl to and venting vapors from fuel flowing through the tubular body, the larger inlet receiving a funnel insert including a nozzle opening positioned to cooperate with the internal configuration of the tubular body.

13. The fuel filler tube assembly of Claim 12, wherein the funnel insert includes a sealing surface formed about an inlet opening.

14. The fuel filler tube assembly of Claim 13, wherein a portion of the funnel insert defining the inlet opening creates the sealing surface.

15. The fuel filler tube assembly of Claim 12, further comprising a vent tube connected to the filler tube.

16. The fuel filler tube assembly of Claim 15, further comprising a fuel tank connected to the filler tube.

17. The fuel filler tube assembly of Claim 16, wherein the vent tube also connects the filler tube and the fuel tank.

18. The fuel filler tube assembly of Claim 12, further comprising a fuel tank connected to the filler tube.

19. The fuel filler tube assembly of Claim 12, wherein the internal configuration of the tubular body includes a tapered section of the tubular body.

20. The fuel filler tube assembly of Claim 19, wherein the tapered section includes an elliptically shaped junction between a first portion of the tubular body including the inlet and a second portion of the tubular body including the outlet.

21. The fuel filler tube assembly of Claim 20, wherein the elliptically-shaped junction lies on a plane inclined at an angle to an axis of at least one of the inlet and outlet.

22. The fuel filler tube assembly of Claim 20, wherein the inlet has a diameter D_1 , the outlet has a diameter D_2 , and D_1 is at least one and a half times D_2 .

23. The fuel filler tube assembly of Claim 12, wherein the filler tube is a seamless tube.

24. The fuel filler tube assembly of Claim 23, wherein the funnel insert is a seamless tube.

25. The fuel filler tube assembly of Claim 12, wherein the funnel insert is a seamless tube.

26. The fuel filler tube assembly of Claim 12, wherein the funnel insert includes integrally formed threads.

27. The fuel filler tube assembly of Claim 12, further comprising a fuel cap selectively engaging the funnel insert.

28. A method of forming a filler tube assembly for a motor vehicle fuel tank comprising:

drawing a funnel insert;

forming a funnel portion at an end of a filler tube;

forming a relatively large inlet at one end of the funnel portion, the inlet having a first axis;

forming a relatively small outlet at the opposite end of the funnel portion, the outlet having a second axis offset from the first axis;

configuring a transition of the tubular body between the inlet and outlet to induce a swirl to and vent vapors from fuel flowing through the funnel member; and

joining the funnel insert and the filler tube.

29. The method of Claim 28, further comprising forming threads in the funnel insert.

30. The method of Claim 28, further comprising configuring a transition portion of the funnel portion to induce a swirl to passing fuel for venting vapors from the gas tank during fuel filling.

31. The method of Claim 30, wherein said configuring includes:

forming an inlet at one end of the funnel portion, the inlet having a first axis; and

forming an outlet of an opposite end of the funnel portion, the outlet having a second axis offset from the first axis.

32. The method of Claim 28, further comprising forming a sealing surface about an inlet opening to the funnel insert.

33. The method of Claim 32, wherein said forming includes rolling over an edge defining the inlet opening.

34. The method of Claim 28, further comprising cutting a length of tubing stock to form the filler tube.

35. The method of Claim 28, further comprising forming a nozzle receptor in the funnel insert.

36. The method of Claim 31, further comprising joining an end of the filler tube opposite the funnel insert to a fuel tank.

37. The method of Claim 36, further comprising joining opposite ends of a vent tube to the funnel portion and the fuel tank, respectively.

38. The method of Claim 31, further comprising joining a vent tube to the funnel portion of the filler tube.